

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) ~~An apparatus~~ Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:

one or more optical fibers or other waveguides for receiving light; and

one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more modeled tap structures ~~direct~~ directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light ~~through out of the~~ one or more optical fibers or other waveguides, wherein the one or more modeled tap structures is formed by using pattern parameters determined by modeling the desired illumination pattern.

2. (Currently Amended) The commercially produced optical fibers or other waveguides having modeled tap structures ~~apparatus~~ according to claim 1, wherein the illumination pattern is generally spherical in shape.

3. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally in the shape of an arc.

4. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally cylindrical in shape.

5. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally conical in shape.

6. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, further comprising:

one or more reflective surfaces disposed within the one or more optical fibers or waveguides, wherein the one or more reflective surfaces reflects the light so that the reflected beam of light travels in a direction substantially opposite to the original direction of travel of the light.

7. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures ~~have~~has an asymmetrical geometry.

8. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures ~~extend~~extends radially in an arc or completely around the one or more optical fibers or waveguides.

9. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures each ~~comprise~~comprises a continuous circular tap structure.

10. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures comprises a plurality of modeled tap structures which are arranged in an array extending along a length of the one or more optical fibers or waveguides.

11. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures each ~~have~~has a length extending in a longitudinal direction of the

respective optical fiber or waveguide larger than a width extending in a radial direction of the respective optical fiber or waveguide.

12. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, further comprising:  
one or more light sources that ~~provide~~provides the light to the one or more optical fibers or waveguides.

13. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~comprise~~comprises one or more selectively controllable light sources.

14. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 13, wherein the one or more selectively controllable light sources ~~have~~has varying illumination powers.

15. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~provide~~provides at least partially coherent light to the one or more optical fibers or waveguides.

16. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~provide~~provides incoherent light to the one or more optical fibers or waveguides.

17. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~provide~~provides visible light to the one or more optical fibers or waveguides.

18. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~provide~~provides UV light to the one or more optical fibers or waveguides.

19. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~provide~~provides infrared light to the one or more optical fibers or waveguides.

20. (Currently Amended) The ~~apparatus~~commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources ~~comprise~~comprises one or more lasers.

21. (Currently Amended) ~~The apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources ~~comprise~~ comprises one or more semiconductor laser diodes.

22. (Currently Amended) ~~The apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources ~~comprise~~ comprises one or more high power laser diodes.

23. (Currently Amended) ~~The apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources ~~comprise~~ comprises one or more light emitting diodes.

24. (Currently Amended) ~~An apparatus~~ Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:

one or more optical fibers or other waveguides for receiving light; and

one or more a continuous modeled tap ~~structure~~ structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more continuous modeled tap ~~structure~~ structures directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light ~~through out of~~ the one or more optical fibers or other waveguides, wherein the one or more continuous tap

~~structure~~ structures is formed by using pattern parameters determined by modeling the desired illumination pattern.

25. (Currently Amended) ~~An apparatus~~ Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:

one or more optical fibers or other waveguides for receiving light; and

one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more modeled tap structures ~~direct~~ directs the light in predetermined directions so as to optimize an amount of the light output ~~through out of the~~ one or more optical fibers or other waveguides, wherein the one or more modeled tap structures ~~are~~ is formed by using pattern parameters determined by modeling an illumination pattern configured for optimized light output.

26. (Currently Amended) ~~The apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein greater than approximately 90% of the light is output ~~through out of the one or more tap structures~~ optical fibers or other waveguides.

27. (Currently Amended) ~~An apparatus~~ Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:

one or more photon channeling structures for receiving photons; and

one or more modeled tap structures formed in the one or more photon channeling structures configured so that, when the photons ~~travels~~ travel through said photon channeling structures, the one or more modeled tap structures ~~direct~~ directs the ~~light~~ photons in predetermined directions so as to create a desired pattern by scattering, diffraction, reflection and/or refraction ~~of portions of the photons through out of the one or more photon channeling structures, wherein the one or more modeled tap structures is~~ formed by using pattern parameters determined by modeling the desired pattern.

28. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures accordingly to claim 27, wherein the photons comprise light.

29. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures accordingly to claim 27, wherein the photons comprise incoherent radiation.

Claims 30-35. (Canceled)

36. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more



modeled tap structures ~~comprise~~ comprises a plurality of modeled tap structures of a specific shape, depth, and spacing configured by the modeling process to create a desired illumination pattern based on a particular application.

37. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein the one or more modeled tap structures ~~comprise~~ comprises a plurality of modeled tap structures of a specific shape, depth, and spacing configured by the modeling process to create a desired illumination pattern based on a particular application.

38. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the tap structures are modeled using an iterative process.

39. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the tap structures are modeled using a theoretical modeling process.

40. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 24, wherein the tap ~~structure~~ structures are modeled using an iterative process.

41. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 24, wherein the tap ~~structure~~ is-structures are modeled using a theoretical modeling process.

42. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein the tap structures are modeled using a iterative process.

43. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein the tap structures are modeled using a theoretical modeling process.

44. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 27, wherein the tap ~~structure~~ structures are modeled using an iterative process.

45. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 27, wherein the tap structures are modeled using a theoretical modeling process.

46. (New) An apparatus comprising:  
one or more optical fibers or other waveguides for receiving light; and  
one or more tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more tap structures directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the one or more optical fibers or other waveguides, wherein a majority of the light emitted out of the one or more optical fibers or other waveguides does not exit the one or more optical fibers or other waveguides through the one or more tap structures.

47. (New) The apparatus according to claim 46, wherein the majority of the light emitted through the one or more optical fibers or other waveguides is directed in a direction toward a substantially opposite side of the one or more optical fibers or other waveguides from a portion of the light that passes through the one or more tap structures.

48. (New) The apparatus according to claim 46, wherein the one or more optical fibers or other waveguides comprises one or more optical fibers and the one or more tap structures is formed in the cladding and at least a portion of the core.